

REMARKS

Status of the Claims

Claims 23-38 and 40-42 are pending in the present application. Claims 24-29, 34-36, and 38 are withdrawn as directed to a non-elected invention. Claims 1-22 and 39 were previously canceled. Claims 23, 30-33, 37, and 41-42 are amended. Support for the amendment is found throughout the application as originally filed including on page 3-4, bridging paragraph, in the substitute application. No new matter is added by way of this amendment. Reconsideration is respectfully requested.

Amendments to the Specification

The specification is amended to incorporate the subject matter of original claims 3 and 4, per the Examiner's request, *see* below. No new matter is entered by way of this amendment. Reconsideration is respectfully requested.

Issues Under 35 U.S.C. § 112, Second Paragraph

Claims 23, 30-33, 37, and 40-42 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly unclear or as allegedly omitting essential active steps, *see Office Action*, pages 2-5. This rejection is respectfully traversed.

Initially, Applicants submit that it is unnecessary to include a step describing the addition of glucose and fructose. Applicants believe that it is clear from the pending claims that fructose and glucose are obtained from the sucrose substrate via an enzyme. Applicants believe that an ordinary artisan would have understood that the enzyme adds the fructose and glucose from the sucrose substrate since the extracellular enzyme extract has glucosyltransferase activity and fructosyltransferase activity. Accordingly, Applicants do not believe that there is a confusing gap in the claims.

Nevertheless, in an effort to expedite prosecution, the claims are amended to indicate this feature in a clearer manner. Accordingly, in view of the amendments, Applicants believe the rejection is overcome and respectfully request withdrawal.

Objections to the Specification

The specification is objected to because the Examiner asserts that subject matter described in original claims 3 and 4 should be incorporated into the instant application, *see Office Action*, page 5. This objection is respectfully traversed.

Applicants have amended the specification in order to correct the deficiencies pointed out by the Examiner. Reconsideration and withdrawal of this objection are respectfully requested.

Objections to the Claims

The Examiner objects to claim 23 due to a typographical error, *see Office Action*, page 5. This objection is respectfully traversed.

In order to overcome this rejection, Applicants have amended claim 23 to correct each of the deficiencies specifically pointed out by the Examiner. Applicants respectfully submit that the claims, as amended, particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Accordingly, reconsideration and withdrawal of this objection are respectfully requested.

Issues Under 35 U.S.C. §§ 102 (b)/103(a)

Claims 23, 37, and 40-42 remain rejected under 35 U.S.C. § 102(b) as allegedly anticipated, or in the alternative, as allegedly obvious over Manaca De Nardra *et al.*, *International Journal of Food Microbiology*, 1995, 27:101-106, (“Manaca De Nardra”), *see Office Action*, pages 6-10. This rejection is respectfully traversed.

Applicants note that the Examiner states that “claim 43” is rejected, however, this appears to be a typographical error since the examined claims do not include a claim 43.

The Examiner reiterates that Manaca De Nardra expressly describes a biopolymer having the glucose/fructose ratio described in the instant claims. The Examiner further states that the additional properties of the claimed biopolymer are not expressly described in the cited reference. Nevertheless, the Examiner reiterates that these additional properties are inherent to Manaca De Nardra’s biopolymer.

In response to Applicants’ previous arguments, the Examiner states that the claims are not limited to glucose and fructose. That is, since the claims specify the term “comprising” the claims encompass Manaca De Nardra’s biopolymers, which include additional hexoses, such as

galactose. In addition, the Examiner states that the instant application does not provide evidence that, unlike the polymer of Manaca De Nardra, the claimed biopolymer is not hydrolyzed at 4N HCL.

The claims are not anticipated by Manaca De Nardra

As indicated above, Applicants have amended claims 23, 41, and 42 to specify that "hexoses in the isolated and purified biopolymer consist of fructose and glucose." Accordingly, unlike the biopolymer described in Manaca de Nardra, the claimed biopolymer does not include galactose. Applicants reiterate that Manaca de Nardra's biopolymer contains glucose, fructose and galactose as hexoses. The biopolymer of Manac de Nardra is hydrolyzed by HCL 4N, as described in the methods and materials and Table 1 of Manaca de Nardra.

In contrast, the claimed biopolymer is entirely stable in the presence of strong acids and strong bases. Further, the claimed biopolymer is not hydrolyzed by HCL, H₂SO₄, NaOH or KOH. Since the claimed biopolymer, which is a soluble fiber, is stable in acids and bases, it may be employed in functional nutrition, *see* Applicants' response submitted September 27, 2010.

In view of the foregoing, the claims are not anticipated by Manaca de Nardra.

The claims are not obvious in view of Manaca de Nardra

Applicants further submit that Manaca de Nardra does not teach or suggest hexoses in the isolated and purified biopolymer that consist only of fructose and glucose. Accordingly, the claims are not rendered obvious by Manaca de Nardra and withdrawal of the rejection is respectfully requested.

Notwithstanding the foregoing, Applicants submit the following additional arguments in support of the non-obviousness of the amended claims.

1. Microorganism's origin:

The purpose of Manaca de Nardra disclosure is to study a microorganism, which is present during Argentine wine production, *i.e.*, *Pediococcus pentosaceus*. This specific microorganism produces polysaccharides that modify the viscosity of the wines thereby affecting the wine quality. Accordingly, the purpose of Manaca de Nardra is to characterize some of these polysaccharides in order to identify treatment methods for removing the polysaccharides from the wine.

In contrast, the purpose of the present invention concerns **obtaining biopolymers by employing enzymatic activity on sucrose**. For this purpose, the inventors obtained soil samples from potato-producing regions in Colombia (Cundiboyacence region) and these were employed for isolating extracellular biopolymer producing microorganisms. These microorganisms were characterized in view of the extracellular enzyme extracts produced and their ability to produce biopolymers.

The purpose for studying polysaccharides:

The research approach of Manaca de Nardra with respect to the present application is completely different. Manaca de Nardra sought to study polysaccharides in order to remove these from the wine as evidenced at the end of the article: *"This knowledge is important for the selection of specific enzymes for the elimination of wine viscosity", emphasis added.*

On the contrary, the present application seeks to identify microorganisms, which produce extracellular enzyme extracts, which also catalyze the production of biopolymers.

Purpose of identifying enzyme-producing microorganisms in the present invention:

The research field of the present application is the production of biopolymers by using enzymes. Consequently, the solution was sought by identifying enzyme producing microorganisms using only sucrose as a substrate. The present application concerns a biopolymer, which is produced from the glucose and fructose provided by the sucrose. Therefore, the extracellular enzyme extract has at least two types of activity:

- hydrolytic activity for hydrolyzing the sucrose, thereby producing glucose and fructose; and
- transfer activity for incorporating the glucose and fructose molecules, thereby obtaining the biopolymer.

In view of the above remarks, Applicants submit that an ordinary artisan would not have achieved the instant invention from Manaca de Nardra, if attempting to solve the technical problem of the present application. Specifically, a person of ordinary skill in the art who seeks to obtain specific biopolymers, by enzymatically treating sucrose would not have viewed as relevant a document which seeks to characterize the polysaccharides produced by a microorganism in order to remove the polysaccharides from the wine.

Additionally the biopolymer, sought to be obtained by enzymatic activity, required features, which make the biopolymer suitable for the applications or uses described in the instant claims. For example, the biopolymer may be used as a soluble fiber to be employed in foods and also as a film to be employed in packaging.

In view of the foregoing, the claimed biopolymer was characterized for the following features:

- vitreous transition points; and
- the non-hygroscopicity

These features are important because they affect the processability of the biopolymer for obtaining films to be employed in packaging.

In addition, the inventors also studied:

- the viscosity of the biopolymer
- the water solubility
- the stability at specific pH

The characteristics of these features are also important for using the obtained biopolymer in foods.

The above features are not relevant to Manaca de Nardra, as this document characterizes only polysaccharides, which are to be removed from wine, due to their negative effect on wine quality. Accordingly, an ordinary artisan would not have been able to achieve the claimed biopolymer from Manaca de Nardra, since the purpose of Manaca de Nardra is to characterize polysaccharides, which are to be removed from wine. The desired, claimed biopolymer, obtained from enzymatic technology, required searching for microorganisms from soil samples. Accordingly, at least for the above reasons, the claimed invention is not obvious in view of Manaca de Nardra. Withdrawal of the rejection is respectfully requested.

CONCLUSION


In view of the amendments and remarks, Applicants believe the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Linda T. Parker, Ph.D., Registration No. 46,046, at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,

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